



Date of Application, 23rd Oct., 1890

Complete Specification Left, 21st July, 1891—Accepted, 22nd Aug., 1891

PROVISIONAL SPECIFICATION.

Improvements in the Manufacture of Strainer or Knotter Plates for Straining Paper Pulp, Wood Pulp, and the like.

We, HENRY BURNETT WATSON and JOHN STANLEY WATSON, both of High Bridge Works, Newcastle on Tyne, in the County of Northumberland, Members of the firm of Henry Watson & Sons, Engineers Brass and Iron Founders, do hereby declare the nature of this invention to be as follows:—

5 Strainer plates or knotter plates for use in straining paper pulp wood pulp and the like have been constructed in various forms. According to one construction separate plates or sections each formed with a row of slits have been constructed to slide or enter between the ribs or bars of a suitable frame to which the said plates could be fastened by screws or otherwise. For the purpose of affording the requisite  
10 strength to resist the pressure against the one side resulting from the formation of a partial vacuum at the other which is necessary to effect the straining operation the plates have been made with ribs between the slits. According to another plan there have been formed in a single casting strainer plates with ribs the ribs  
15 corresponding to the frames of the before described strainer plates and the intervening parts corresponding to the removable plates above referred to and having slits formed therethrough.

The first mentioned construction has been open to objection in consequence of the liability of fibres and of resin (in the case of wood pulp) to adhere to the ribs and thus to cause accumulations such as eventually to produce in paper manufactured  
20 from the pulp what are known as knots or blotches resulting in waste owing to the parts of the paper containing such defects being unsuitable for use.

The secondly mentioned construction of strainer or knotter plates has also been open to objection owing to the liability of portions of the pulp to adhere thereto. Not only so but when in consequence of wear or the action of acids, such as sulphurous  
25 or sulphuric acid present for example in what is known as sulphite wood pulp, any of the slits have become too large to act efficiently in straining the pulp, the whole plate has become useless.

Now the present invention has reference to an improved manufacture of strainer or knotter plates in which renewable slitted parts of peculiar construction are  
30 combined with a frame in such a manner as to produce a compound strainer or knotter plate that shall be comparatively light and strong, shall offer considerable resistance to the action of acids and shall not present obstructing or accumulating surfaces such as those hereinbefore referred to as causing the formation of knots or blotches in the product. And in order that the nature of this invention may be  
35 clearly understood, reference will now be had in describing the same to the annexed sheet of illustrative drawings in which

Fig. 1 is a plan or top view of a removable section or part of a compound strainer plate according to this invention.

Fig. 2 is an under side view of the same.

40 Fig. 3 is an end view thereof.

Fig. 4 is a plan or top view of a complete compound strainer or knotter plate comprising a number of plates such as that illustrated in Figs. 1 to 3 inclusive combined with a frame adapted to receive and hold the same.

*a* is a frame that may be constructed of any suitable material such as cast bronze;   
45 it is made with longitudinal bars *b* (three are shewn) with two end transverse bars *c c* and with six or any other convenient number of transverse bars *d* connecting the longitudinal bars. In the example the central longitudinal bar and the transverse bars are formed with raised parts *b<sup>1</sup> c<sup>1</sup> d<sup>1</sup>* the depth of which is equal to the

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thickness of the removable sections *e* which are made with bevelled edges adapted to fit into bevelled grooves in the said parts *b*<sup>1</sup> *c*<sup>1</sup> *d*<sup>1</sup> as represented in Figs. 4 and 5, so that each of the removable sections can be slidden into position in the frame and be there secured by screws as at *f* *f*, and any one or more of them can, in case of need, be readily removed and replaced, or another be substituted therefore if necessary. For the purpose of dispensing with numerous ribs or projections liable to cause obstruction such as hereinbefore referred to, whilst providing strainer plates having the requisite strength, and which shall not be liable to injury by acid, the removable sections are constructed of a suitable alloy such as copper and tin in the proportions of say about 95 *per cent.* of copper to 5 *per cent.* of tin, and with longitudinal rows of slits *g* *g* with an intervening part *h* having the same depth or thickness as the remainder of the plate, those parts of the outer portion of the plate and longitudinal part *h* of the plate which correspond to the ends of the slits having a bevelled or curved formation so that the slits gradually increase in length towards the under surface of the plate so as to obviate liability to adherence or accumulation of portions of pulp. The above described construction will enable removable sections of the requisite strength to be made of considerably larger area than has been found practicable with removable sections as heretofore usually constructed, thus greatly reducing the obstructing area incidental to grooves or bars such as obtain in strainer plates of constructions now in use.

Dated this 23rd day of October 1890.

W. LLOYD WISE,  
46, Lincoln's Inn Fields, London, W.C., Agent for the Applicants.

## COMPLETE SPECIFICATION.

## Improvements in the Manufacture of Strainer or Knotter Plates for Straining Paper Pulp, Wood Pulp, and the like.

We, HENRY BURNETT WATSON and JOHN STANLEY WATSON, both of High Bridge Works, Newcastle-on-Tyne, in the County of Northumberland, Members of the Firm of Henry Watson & Sons, Engineers, Brass and Iron Founders, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

Strainer plates or knotter plates for use in straining paper pulp, wood pulp, and the like, have been constructed in various forms. According to one construction separate plates or sections each formed with a row of slits have been constructed to slide or enter between the ribs or bars of a suitable frame to which the said plates could be fastened by screws or otherwise. For the purpose of affording the requisite strength to resist the pressure against the one side resulting from the formation of a partial vacuum at the other, which is necessary to effect the straining operation, the plates have been made with ribs between the slits. According to another plan there have been formed in a single casting, strainer plates with ribs, the ribs corresponding to the frames of the before described strainer plates and the intervening parts corresponding to the removable plates above referred to and having slits formed therethrough.

The first mentioned construction has been open to objection in consequence of the liability of fibres and of resin (in the case of wood pulp) to adhere to the ribs and thus to cause accumulations such as eventually to produce in paper manufactured from the pulp what are known as knots or blotches resulting in waste owing to the parts of the paper containing such defects being unsuitable for use.

The secondly mentioned construction of strainer or knotter plates has also been open to objection owing to the liability of portions of the pulp to adhere thereto. Not only so but when, in consequence of wear or the action of acids (such as sulphurous or sulphuric acid, present, for example, in what is known as sulphite wood

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pulp) any of the slits have become too large to act efficiently in straining the pulp, the whole plate has become useless.

Now the present invention has reference to an improved manufacture of strainer or knotter plates in which renewable slitted parts of peculiar construction are  
5 combined with a frame in such a manner as to produce a compound strainer or knotter plate that shall be comparatively light and strong, shall offer considerable resistance to the action of acids, and shall not present obstructing or accumulating surfaces such as those hereinbefore referred to as causing the formation of knots or blotches in the product. And in order that this invention may be clearly under-  
10 stood, reference will now be had, in describing the same, to the sheet of illustrative drawings left with our Provisional Specification and to the accompanying two sheets of additional drawings.

Fig. 1 is a plan or top view of a removable section or part of a compound strainer plate according to this invention.

15 Fig. 2 is an under side view of the same.

Fig. 3 is an end view thereof.

Fig. 4 is a plan or top view of a complete compound strainer or knotter plate, comprising a number of plates such as that illustrated in Figs. 1 to 3 inclusive combined with a frame adapted to receive and hold the same.

20 Fig. 5 is a section in the line *x x* of Fig. 4.

*a* is a frame that may be constructed of any suitable material, such as cast bronze; it is made with longitudinal bars *b* (three are shewn) with two end transverse bars *c c*, and with six or any other convenient number of transverse bars *d* connecting the longitudinal bars. In the example, the central longitudinal bar  
25 and the transverse bars are formed with raised parts *b<sup>1</sup> c<sup>1</sup> d<sup>1</sup>* the depth of which is equal to the thickness of the removable sections *e* which are made with bevelled edges adapted to fit into bevelled grooves in the said parts *b<sup>1</sup>, c<sup>1</sup>, d<sup>1</sup>*, as represented in Figs. 4 and 5, so that each of the removable sections can be slidden into position in the frame, and be there secured by screws, as at *f f*, and any one or  
30 more of them can, in case of need, be readily removed and replaced, or another be substituted therefor if necessary. For the purpose of dispensing with numerous ribs or projection liable to cause obstruction such as hereinbefore referred to, whilst at the same time providing strainer plates having the requisite strength, and which shall not be liable to injury by acid, the removable sections are constructed of a  
35 suitable alloy such as copper and tin, in the proportions of say about 95 *per cent.* of copper to 5 *per cent.* of tin, and with longitudinal rows of slits *g g* with an intervening part *h* which in the example shown in Figs. 1 to 5 inclusive, is of the same depth or thickness as the remainder of the plate, those parts of the outer portion of the plate and longitudinal part *h* of the plate which correspond to  
40 the ends of the slits having a bevelled or curved formation so that the slits gradually increase in length towards the under surface of the plate, so as to obviate liability to adherence to accumulations of portions of pulp. The above described construction will enable the removable sections of the requisite strength to be made of considerably larger area than has been found practicable with  
45 removable sections as heretofore usually constructed, thus greatly reducing the obstructing area incidental to grooves, bars or ribs such as obtained in strainer plates of constructions now in use.

Fig. 6 of the accompanying drawings is a plan or top view illustrating a removable section similar to those hereinbefore described excepting that the  
50 intervening part *h* is made to extend slightly above the general level or surface of the section.

Figs. 7, 8, 9, 10, 11, and 12 are cross sections to a larger scale illustrating various forms in which the intervening part *h* can be made so as to extend either above or below, or both above and below the general surface or surfaces of  
55 the sections, in order to form a rib or ribs arranged at right angles to the slits *g*, and which will impart additional stiffness and rigidity to the sections. Such removable sections with extended rib—or ribs may be cast, rolled or pressed.

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Figs. 13 and 14 are similar views to Figs. 4 and 5 respectively, illustrating a complete strainer or knotter plate with removable sections having such extended intervening parts *h*.

Instead of making the strainer plates of the same thickness at the margin as they are made where the slits *g* occur, as shown in the previously described constructions of sections, we have found it desirable for the purpose of securing the requisite strength to make the marginal portions thicker as represented in Figs. 15, 16, 17, 18, and 19, which are similar views to Figs. 1, 2, 3, 4, and 5 respectively, *e'* *e'* being the thickened margins of the sections *e*.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed we declare that what we claim is:—

1. The hereinabove described improved construction of strainer or knotter plate wherein the removable sections *e e*, supported in the frame composed of longitudinal and transverse bars *b b*, *c c*, *d d* with raised parts *b'* *b'*, *c'* *c'*, *d'* *d'*, consists each of a metallic plate through which are formed rows of slits *g g*, the said rows of slits being separated by an intervening part *h* having either the same depth or thickness as the remainder of the plate, or made to extend above or below, or both above and below the general level or surface of one or both sides of the plate so as to form a rib or ribs of the kind mentioned, and the ends of the slits are bevelled or curved for the purpose specified, whether the marginal portions be thickened or not.

2. A strainer or knotter plate such as referred to in the preceding claim, having removable sections *e e* such as described made by casting pressing or rolling thin plates of an alloy of copper and tin in (or approximately in) the proportions of 95 *per cent.* of copper and 5 *per cent.* of tin and forming therein rows of slits *g g* with intervening strengthening part *h* substantially as described with reference to the examples illustrated.

Dated this 18th day of July 1891.

HENRY BURNETT WATSON.  
JOHN STANLEY WATSON.

W. Lloyd Wise,  
46, Lincoln's Inn Fields, London, Agent for the Applicants.

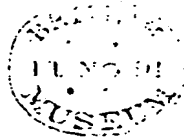




FIG. 4.

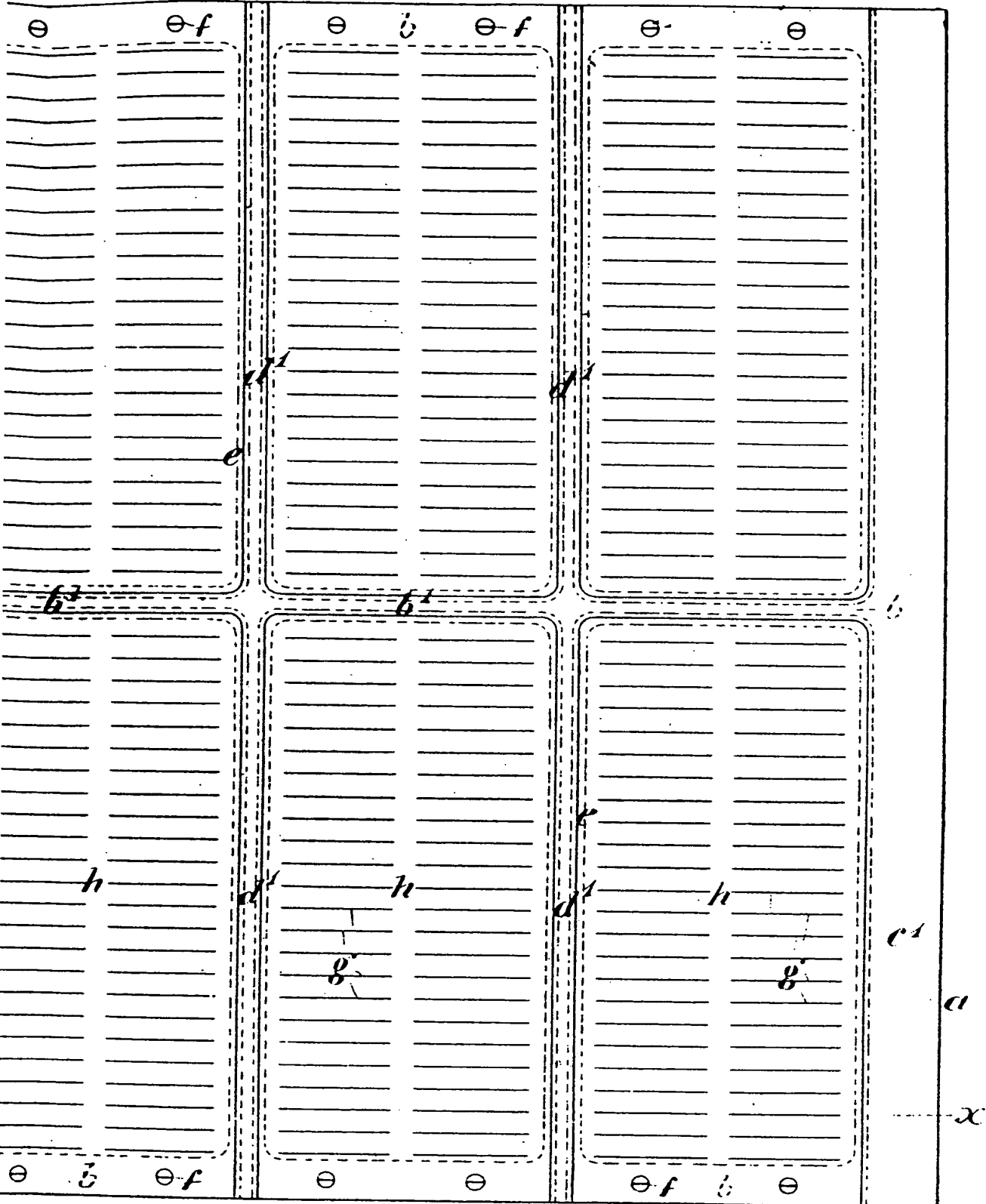


FIG. 5.

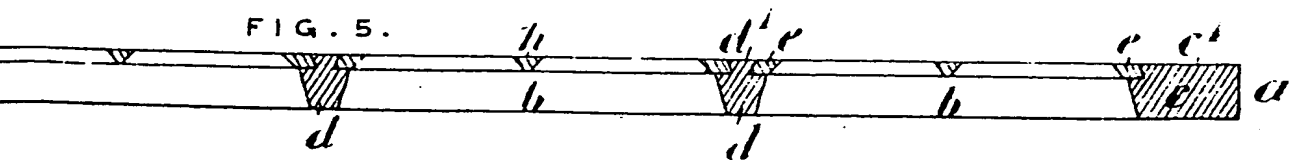


FIG. 6.

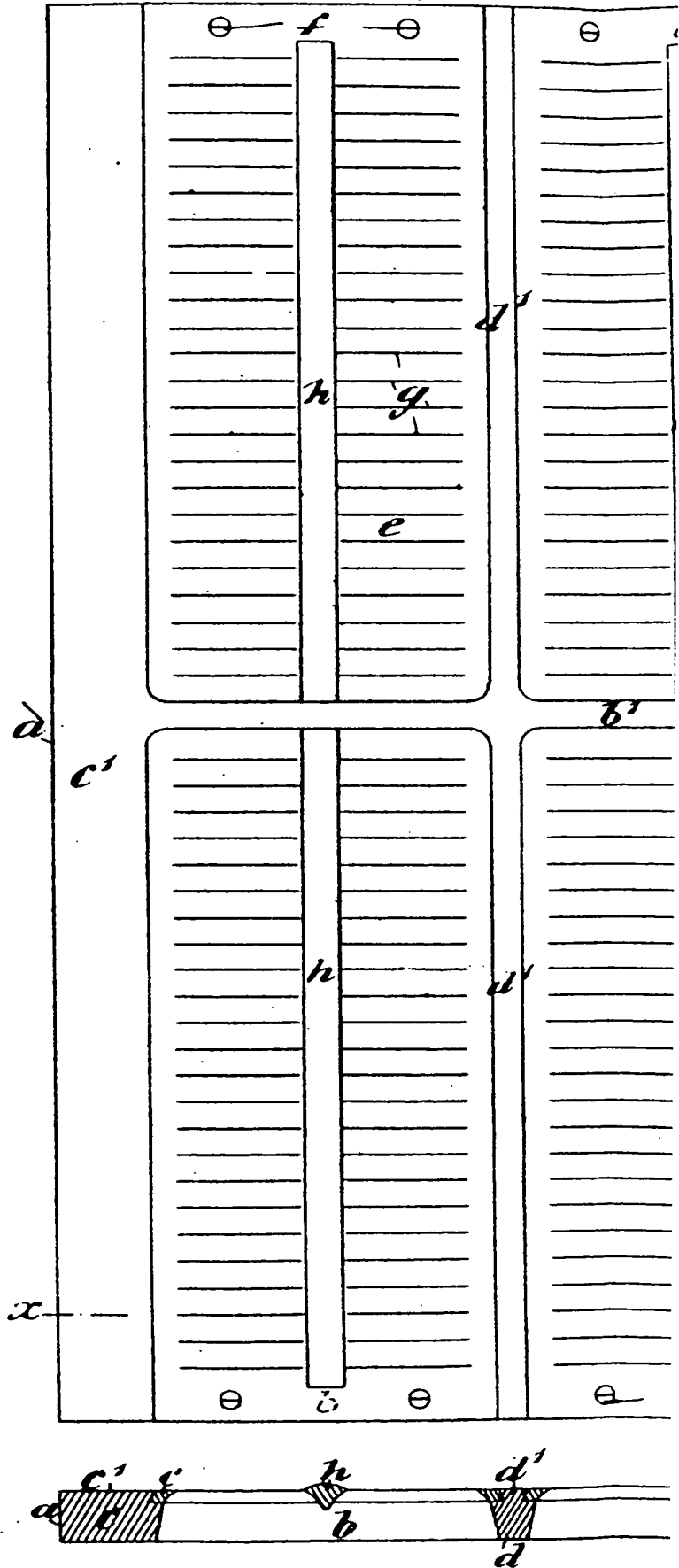
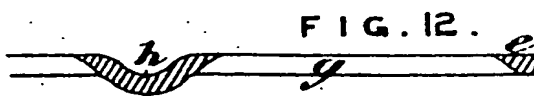
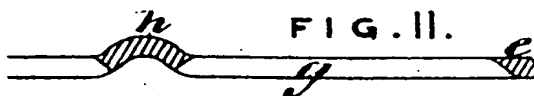
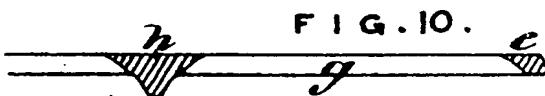
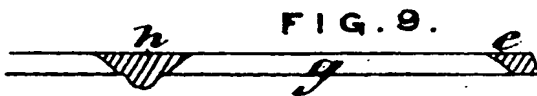
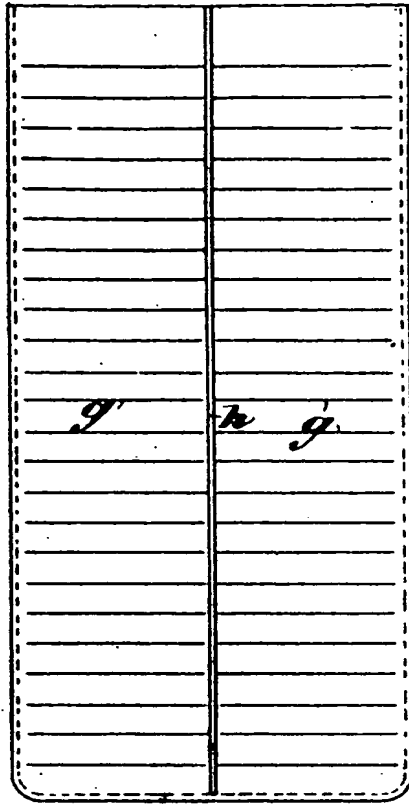


FIG. 13

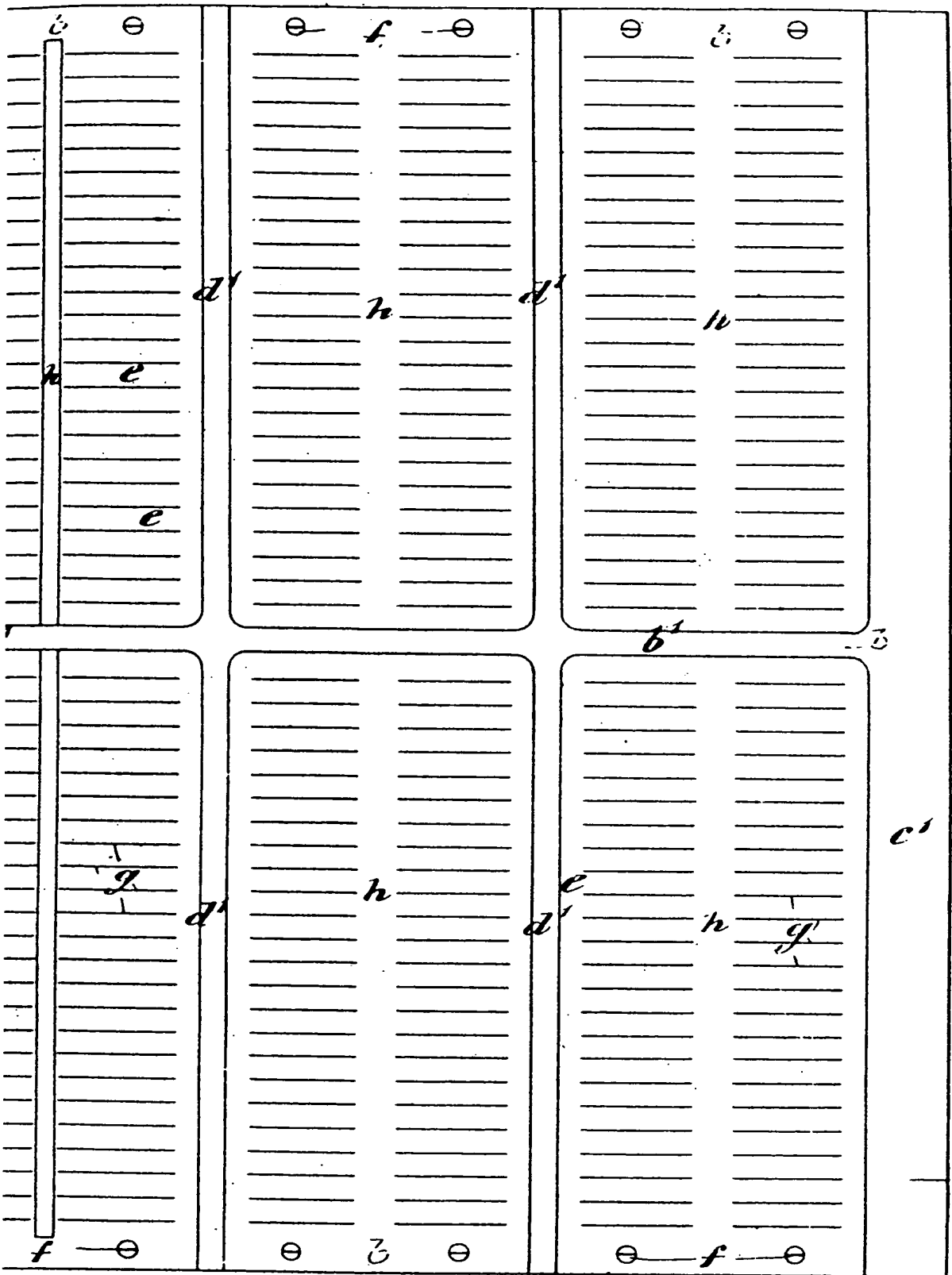


FIG. 14.

